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ABSTRACT

Using the data from the Educational Opportunities Survey (1965), this report shows shows that for sixth grade students, 24 percent of the total differences among students in their academic achievement is the maximum national value that can be associated with their membership in one of six racial-ethnic groups (Indian, Mexican, Puerto-Rican, Negro, Oriental, or white). This relationship prevails before the allocation of these groups to different social conditions has been taken into account. After a variety of social condition variables have been accounted for, such as the social and economic well-being of the family, the presence or absence of key family members, the students and parents aspirations for his schooling, etc., the precentage of difference dropped to 1.2. Similar results were obtained for other grade levels and for each region of the country. Hence, no inferences can be made about the "independent effect" of membership in a particular racial-ethnic group on academic achievement because of the influence of a variety of social conditions. Other analyses show that variables pertaining to the motivational and attitudinal aspects of family life play a greater role in academic achievement than either racial-ethnic group membership, social class membership, or the type of school attended. (Author/JW)

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On the Explanation of Racial-Ethnic Group Differences in Achievement Test Scores

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Introduction

My colleagues** and I in the U.S. Office of Education have been privileged to be charged with the responsibility for illustrating and documenting the structure and functioning of the American public school system. We could not dream of having such a lofty objective if we did not have at our disposal the most comprehensive body of data ever collected on public schools and their students in the United States. I am, of course, referring to the Educational Opportunities Survey data collected in the fall of 1965 at the direction of Congress in the Civil Rights Act of the prior year. A report utilizing this data to investigate the Equality of Educational Opportunity for various racial and ethnic groups was issued in the fall of 1966 under the principal authorship of James S. Coleman. Today I would like to present excerpts from two reports that utilized this same body of data (Mayeske, et. al., 1969; 1971) as well as some special analyses that pertain to the explanation of racial-ethnic group differences in achievement. But let me first focus on the nature and scope of the data base and the background work that was done in preparation for these reports.

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* The views expressed in this paper are those of the author and do not reflect the official policy of the U.S. Office of Education.

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The Data Base and Background Work

The Educational Opportunities Survey entailed the testing and surveying of about 650,000 students in some 4000 public schools throughout the country in grades 1, 3, 6, 9 and 12, together with their teachers, principals and superintendents. The Survey sample consisted of a 5 percent sample of schools. The data base is comprehensive in that detailed factual and attitudinal information was collected on the students home background, attitude towards school, race relations and the world. A battery of ability and achievement tests was administered at each grade level. Information was collected from some 60,000 teachers and 4,000 principals concerning their training and experience, their view of the school, etc. The final part of the teacher questionnaire consisted of a 30 item contextual vocabulary test which was intended to be a measure of the verbal facility of the teacher. In addition, the principal provided data on the school's facilities, staff, programs, curricula, etc. For further detailed information on the survey data I will refer you to the report "Equality of Educational Opportunity" (Coleman, et.al., 1966).

The main goal of our background work was to reduce the more than 400 variables in an empirically meaningful way into indices and sets of indices so that the volume of data processing and complexity of later analyses could be reduced. Before the variables could be reduced into meaningful groupings, however, decisions had to be made concerning the estimation of missing data and the coding or scaling of variables. As a guide in the estimation of missing data or handling of non-responses, it was decided to analyze the responses to each question against one or more criteria or dependent

variables so that not only the percent responding to each item or response alternative, but also their mean score on the dependent variable could be used as a guide in coding the variables and in assigning a value to the non-respondents. Since the approach differed somewhat for the student, teacher and principal questionnaires each analysis will be described separately.

A factor analysis of the achievement measures* showed that a single factor could be used to describe their intercorrelations**. Accordingly, the weights from the first principal component of the intercorrelations were used to weight scores on the individual tests and sum them to obtain an overall composite of academic achievement***. It was this composite which was used as a criterion against which item responses were analyzed (Mayeske, et.al., 1968). This composite is also the dependent variable for many later analyses.

In order to maximize the linear relationship of each student variable with student achievement, criterion scaling (Beaton, 1969) was employed. By criterion scaling is meant that each item response was coded or scaled

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* The tests were: (1) General Information; (2) Reading Comprehension; (3) Mathematics Achievement; (4) Verbal Ability and; (5) Non-Verbal Ability. For grades 9 and 12 all five tests were available, for grades 6 and 3 tests 2 through 5 were available and, for grade 1 only 4 and 5 were available. See Coleman, (1966) for details on these tests.

** The first principal component of the intercorrelations accounted for 75 percent of the variance for grades 6, 9 and 12; 60 percent for grade 3 and 82 percent for grade 1. Similar results were obtained for separate racial-ethnic and regional groupings of students (Mayeske and Weinfeld, 1967).

*** For grades 6, 9 and 12 tests (3) and (5) received slightly lower weights than for the other grade levels. See the Appendix for the group standard deviations on the composite for the different grade levels.

by assigning the mean value of the dependent variable for each of the different response alternatives for an item*.

For the teacher variables, each item was analyzed against the teacher's total score on a self-administered contextual vocabulary test. (Mayeske, et.al., 1967). For the principal variables, each item was analyzed against the number of students enrolled in the school, the rural-urban and socio-economic status of the school and, the principal's salary (Mayeske, et. al, 1968). These analyses were used as guides in assigning codes or scale values and in estimating missing data**.

To obtain meaningful groupings of variables, the intercorrelations of the student, teacher and principal sets of variables were each subjected to a series of factor analyses. The Principal Component technique was used to extract components and the Varimax technique was used to rotate components having a root of one or greater (Horst, 1965). This approach was essentially iterative in that variables that did not form meaningful groupings or blurred an otherwise meaningful grouping were eliminated and the remaining variables were refactored. The teacher and student variables readily fell into meaningful groupings after two iterations which resulted in the elimination of about six to twelve variables from each set. The highest weights from the Varimax rotation were used to combine the variables to obtain index scores. In order to keep the index score intercorrelations low a variable was allowed to have a weight on only one index.

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* Almost all of the student variables were coded in this manner. When the results of this scaling technique were compared with a more conventional procedure it was found that they were very similar except for some of the attitudinal items which were linearized by the criterion scaling procedure (Mayeske, et.al., 1969).

** However, for the teachers and principals questionnaires the items were not coded so as to maximize their relationship with these dependent or criterion variables.

The variables from the principal questionnaire dealt with a wide variety of different aspects of the school. These variables did not readily fall into any naturally meaningful groups. Consequently, a priori groupings, such as variables concerned with the physical plant or instructional facilities were subjected to a Principal Component analysis. The weights from the first principal component were then used to obtain index scores for each school.

A brief description of the indices obtained and other variables retained for future analyses are given in the Appendix. Time does not permit for a full discussion of them now, however, they are given for reference purposes and will be discussed in later portions of the text. Using these indices we have conducted an extensive number of analyses, a small portion of which I would like to present today. For our discussion today we have chosen the sixth grade students and their schools as the major level of focus. At this grade level the dropout rate is not as severe for many minority group students as it is at the higher grade levels and the number of schools in the sample is quite substantial. However, at the higher grade levels the student indices are more comprehensively measured and the errors in racial-ethnic group identification are less severe than at the lower grade levels hence, some results for these grade levels will also be brought into the discussion. Adequate measures of student attitudes and motivation were not available for grades 1 and 3 and hence these grade levels will not enter further into the discussion.

A Measure of Racial-Ethnic Group Membership

We wanted to incorporate in our analyses a variable that would indicate a student's membership in each of the racial-ethnic groups so that we could see how these different groups stood with respect to one another at different points in the analyses. Since these are discrete groups we had to scale or order them in some manner so that a quantitative variable denoting group membership could be incorporated into the analyses. Our primary dependent variable of interest was achievement and consequently we decided to order the groups according to their mean scores on our achievement composite (ACHV). An explanation of this procedure is given in Table 1.

Table 1 gives the percent of students* in each of the racial-ethnic groups along with the mean ACHV score attained by students who identified themselves as belonging to one of these groups. On a distribution with a mean of 50 and standard deviation of 10 we can see that whites attain the highest score with Orientals following them by about 4 points. Approximately 5 to 7 points below them lie the Indians, Mexicans and Negroes with the Puerto-Ricans following these groups by another 4 points.

Now when each student is assigned the mean ACHV score attained by members of his racial-ethnic group the ordering of these groups is said to be criterion scaled (Beaton, 1969). This means that the relationship of our racial-ethnic group membership variable with ACHV is the maximum relationship that can be obtained. No other ordering of these groups will yield a higher relationship. When scores on our racial-ethnic group membership variable,

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* In order to obtain more reliable estimates minority group students were oversampled. The percentages in Table 1 are weighted by sampling ratios to more nearly reflect population values. Almost half of the students in the sample were from minority groups (Coleman, et.al., 1966).

Table 1 - Percent of Sixth Grade Students and Their Average Composite Achievement Score Classified by Racial-Ethnic Group Membership

CATEGORY	RACIAL-ETHNIC GROUP	PERCENT	MEAN ACHV.
1	American Indian	2.6	44.194
2	Mexican-American	6.1	42.244
3	Puerto-Rican	2.0	38.560
4	Negro	15.7	42.513
5	Oriental	0.9	49.391
6	White	69.6	53.181
7	Other	1.4	45.605
8	No Response	1.7	43.144
	Total	100.0	50.000*

* The Total number of students is 123,386. The standared deviation for the Total was equal to 10. All figures are weighted for sampling. Later analyses exclude categories 7 and 8.

which we shall call RETH from hereon, are correlated with scores on our ACHV composite the correlation obtained will be a maximum. We are particularly interested in what this maximum value might be and how it changes as different social conditions in which these groups are found are first taken into account.

Racial-Ethnic Group Differences in Achievement Adjusted for Social Background Conditions

Our first question then is: "What is the magnitude of this maximun value?" This is indicated by the squared correlation of RETH with ACHV, which is 24 percent and corresponds to the mean differences in the NONE column of Figure 1*. This is called NONE because none of the background conditions on which these groups differ has yet been taken into account.

Next we may ask, "What is the percent of variation in ACHV associated with RETH after differences among students in their Socio-Economic Status (SES) have been taken into account?" A student with a high score on the SES index has parents who come from the higher educational strata, his father is engaged in a professional, managerial, sales or technical job, there are two to three children in the family, about six to ten rooms in their home, they are more likely to reside in the residential area of the city or the suburbs rather than in the inner city and there are intellectually stimulating materials accessible in the home such as books, magazines, newspapers, television and radio. By taking SES into account we mean that

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* These mean values differ slightly from those in Table 1 due to restandization after the exclusion of students in categories 7 and 8.

we obtain a squared multiple correlation for both SES and RETH with ACHV when they are entered into the regression together and subtract from this the squared correlation for SES. The resulting value might be more familiar to many if it is called the "unique contribution" of RETH to ACHV*. The percent of ACHV associated with RETH after SES has been taken into account is 10.9 percent which corresponds to the differences among the group means in the SES column of Figure 1**.

The percent of variation in ACHV associated with RETH after other conditions have been taken into account are:

HB - These are the mean differences after considerations of both SES and the students Family Structure (FSS) have been taken into account. They account for 9.3 percent of the differences in ACHV that remain.

HB, ATTUD - These are the magnitude of the mean differences after considerations of SES, FSS and the students Attitude Towards Life (ATTUD) have been taken into account. They account for 9 percent of the differences in ACHV that remain.

FB - These are the magnitude of the mean differences after the indices which we felt represented all aspects of the students Family

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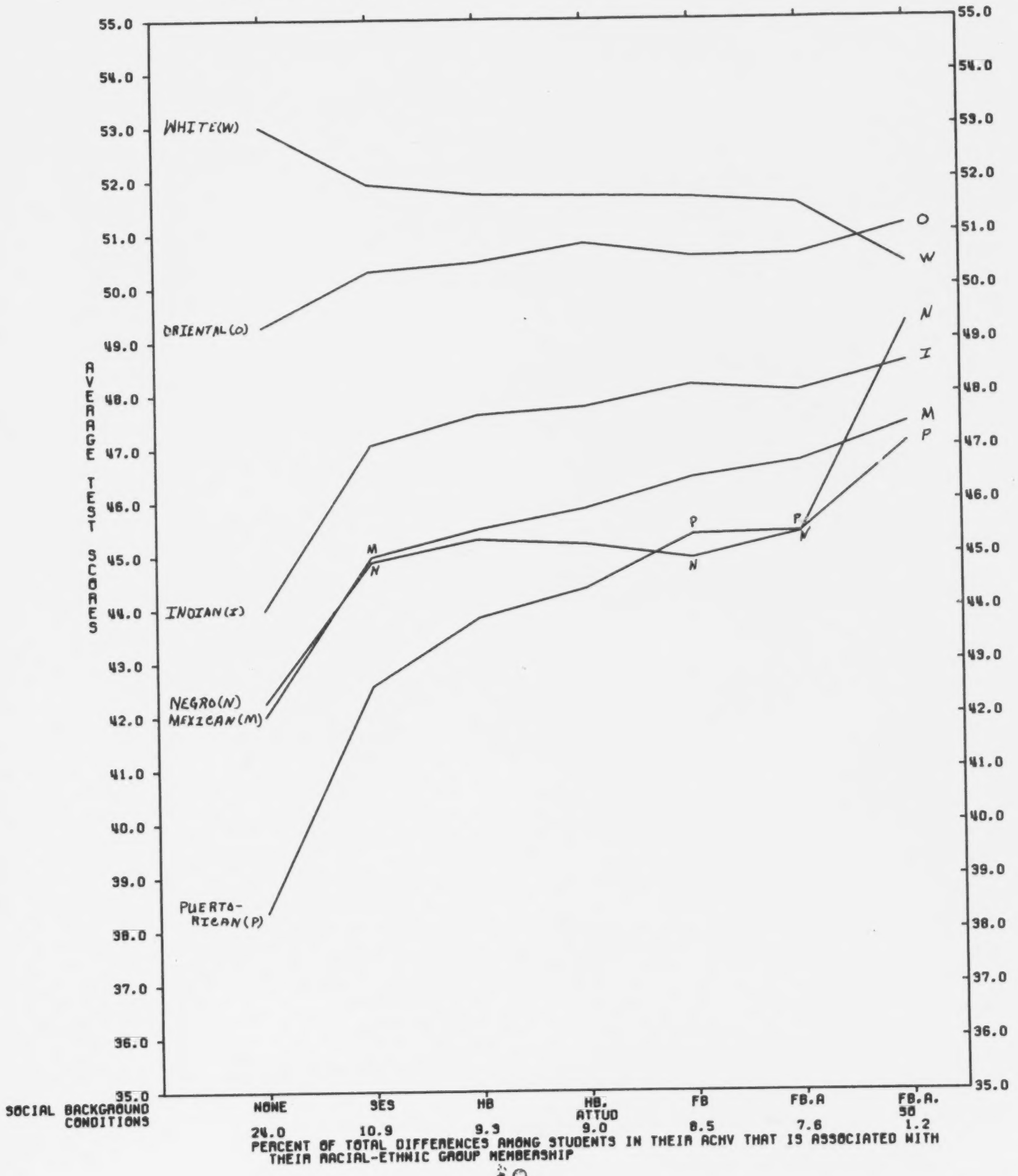
* The computational formula is: $U(RETH) = R^2(SES, RETH) - R^2(SES)$. This same computational formula is used throughout, viz.,U(RETH) is computed by: $R^2(S, RETH)) - R^2(S)$ where S represents the set of variables to be taken into account.

** These means are computed by subtracting from the observed ACHV mean of each group an estimated ACHV mean (using the regression of ACHV on SES) and plotting these as deviations from a mean of 50. This same computational procedure for adjusted means is used throughout (viz., S is used to obtain an estimated mean which is then subtracted from the observed mean and these differences are plotted as deviations from 50, where S represents the set to be taken into account).

FIGURE 1. - RACIAL ETHNIC GROUP ACHIEVEMENT MEANS ADJUSTED FOR SOCIAL BACK-GROUND CONDITIONS



Background (FB) had been taken into account. These indices were SES, FSS and the set of four attitudinal and motivational indices (i.e., indices 1 through 6 in the Appendix). These mean differences account for 8.5 percent of the differences in ACHV associated with RETH that remains.

FB, A, - After FB and Area of Residence (A) whether it be South, Far West or North, or Rural-Suburban or Urban have been taken into account, only 7.6 percent remains.

FB,A,SO - After FB, A and the five school attributes of the achievement and motivational mix of the students one goes to school with have been taken into account, only 1.2 percent remains. This set of five student body variables* represents a number of things. By virtue of its high correlations with the comprehensive set of 31 school variables**, it represents the aggregate effects of schooling. By virtue of its high correlations with the social background of the student body, as defined by their Socio-Economic, Family Structure and Racial-Ethnic Composition**, it represents a measure of school and residential segregation***.

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* There are 2370 schools represented in these analyses.

** See the Appendix for these correlations.

*** Schools being organized according to residential boundaries, circa 1965.

The trend we observe from Figure 1 is that the differences among the racial-ethnic groups in their ACHV levels approaches zero as more and more considerations related to differences in their social conditions are taken into account. This trend is slightly more pronounced for Orientals, whites and Negroes than for the other groups and might be more pronounced for them if more variables pertinent to their special circumstances were also available. We tried English as opposed to some other language spoken in the home but that did not yield any additional information.

Grade Level and Regional Variations

We may next ask: "How do these results compare with those from the other grade levels?" For each of the three grade levels the percent of variation in ACHV associated with RETH before any of the background conditions are taken into account (the NONE condition) and after the FB, A, SO conditions have been accounted for, as these were described in conjunction with Figure 1 are:

GRADE	NONE	FB, A, SO
12	20	1.1
9	22	1.0
6	24	1.2

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* The numbers of students (N) and schools (n) included in these analyses for grades nine and twelve are, respectively: NINTH, N = 133,136, n = 923; TWELTH, N = 96,426, n = 780. Comparable values of RETH with ACHV for the NONE condition are, for the first and third grades respectively, 16 and 17 percent. These latter values are based on N's and n's of: FIRST, N = 74,201, n = 1,302; THIRD, N = 130,213, n = 2,453.

Thus, for each grade level although the percent before any conditions have been taken into account varies from 24 at the sixth through 22 at the ninth to 20 at the twelfth, they all end up at about the same value, namely one percent, after a variety of social background conditions (FB, A, SO) have been taken into account. Comparable values for each region* are:

	6		9		12	
REGION*	NONE	FB,SO	NONE	FB,SO	NONE	FB,SO
NORTH NON-MET	17	1	14	.9	5	.6
NORTH MET	21	1	20	.9	16	1.8
SOUTH MET	26	1	25	.8	28	.1
SOUTH NON-MET	30	1	27	.5	30	.9

Thus, although the percent of variation in ACHV associated with RETH varies considerably by region, from a high of 30 percent in the non-metropolitan South to a low of 5 percent in the non-metropolitan North, they all end up at roughly the same value after adjustments have been made for a variety of social background conditions (FB, SO). Hence, for all practical purposes, all of the differences among students in their academic achievement (ACHV) that are associated with their racial-ethnic group membership (RETH) can be explained by factors that are primarily social in nature and origin.

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* The set of Area of Residence (A) variables was eliminated from these analyses.

**See the Appendix for the states included in the North and South. The metropolitan and non-metropolitan areas are the census tract standard metropolitan and non-metropolitan statistical areas (SMSA's and NSMSA's) in each region.

But, we may ask,wouldn't the slopes of our curves in Figure 1 be quite different if we had entered the variables into the regression analysis in a different order? Indeed, this would have been the case, however, it would not have affected our beginning and ending values. We shall see in a moment that we can handle quite well the order of inclusion problem. We might also ask of the relative explanatory power of our variable called RETH when put in context with these other sets of variables. It so happens that our technique for handling the order of inclusion problem also allows us to show the manner in which RETH is inseparably intertwined with these other sets of variable as they relate to ACHV.

Commonality Analyses of Social Condition Variables and Racial-Ethnic Group Membership With Achievement

The technique which allows us to resolve the order of inclusion problem is called "Commonality Analysis". Its introduction at this point increases the order of complexity of the discussion substantially. In an attempt to keep things as simple as possible I shall try to give the essence of this technique for two sets of variables and then move on to a larger number of sets which we really need to address the questions we have posed.

Let us suppose we have two sets of variables. One set shall contain variables that pertain to the structural aspects of a family's position in society which we shall call Home Background (HB). The other set will be our variable called RETH. Now, following our earlier computational logic, we can compute a "unique contribution" to ACHV for HB and one for RETH as follows:

(1) $U(HB) = R^2(HB,RETH) - R^2(RETH)$

(2) $U(RETH) = R^2(HB,RETH) - R^2(HB)$

The variance that is common to these two sets of variables, or inseparably intertwined among them, can be obtained by the following formula:

(3) $C(HB,RETH) = R^2(HB,RETH) - U(HB) - U(RETH)$

These three coeffients can be organized in tabular form as follows:

	1 HB	2 RETH
U(Xi)	a	b
C(X1X2)	c	c
R^2(Xi)	a + c	b + c
R^2(X1X2)	a + b + c	

In this table the row labeled U(Xi) contains the unique coefficients as we shall call them for HB and RETH, denoted as "a" and "b", respectively. Their common portion, or second order commonality coefficient as we shall call it since it involves two sets of variables, is denoted by "c". The squared multiple correlation for each set is given in the row labeled R^2(Xi); for HB it is "a + c" and for RETH it is "b + c". The squared multiple correlation for both sets is then given by "a + b + c" in the fourth row. This table then contains a complete partitioning of the variance in ACHV explained by these two sets of variables into their common and unique portions.

For those unfamiliar with this technique it may be helpful to think of a Venn diagram in which the area included in two circles represents the variance explained by both sets of variables, the field or background represents the variance unexplained (i.e., $1-R^2(X1X2)$), the overlap of the circles represents their commonality coefficient (C(X1X2)) while the unique contribution of each set (U(Xi)) is represented by the areas of the circles that do not overlap.

Let us now move to the case of 5 sets of variables which we shall need to answer the questions we have posed. For the 5 set case there will be 2^5-1 or 31 different coefficients that we will organize in tabular form*. In the example of our Venn diagram we can think of the different two way, three way, four way and five way intersections that five circles can have.

The five sets of variables we shall use are:

Home Background (HB) - this set includes the indices of Socio-Economic Status (SES) and Family Structure (FSS). FSS is included here because other analyses have shown it to be highly dependent upon SES in its relationship with ACHV (Mayeske, et. al., 1971).

Family Process (PRCS) - these are the four attitudinal and motivational indices as described in the Appendix (indices 3 through 6). As a set they are called Family Process because they refer to the expectations and aspirations that a child and his parents have for his schooling and the activities that they engage in to support these aspirations.

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* See Wisler, C. E. On Partitioning the Explained Variation in a Regression Analysis (Mayeske, et. al., 1969).

Area of Residence (AREA) - these are the two variables pertaining to region of residence (North - Far West - South) and rural-suburban-urban location.

Aggregate School Outcomes (SO) - these are the five student body variables of the achievement and motivational levels of the students one goes to school with. These are the school averages of the individual student ACHV and PRCS measures.

Racial-Ethnic Group Membership (RETH) - our racial-ethnic group membership variable as developed and described earlier.

Commonality analyses using these five sets of variables are presented in Table 2. From the bottom row of Table 2 we can note that 51 percent of the total differences among students in their ACHV can be associated with these five sets of variables. The next to the last row in this table gives the squared multiple correlation for each of the five sets. We can note that this varies from a high of 32 percent for SO through values for HB, PRCS and RETH of 27, 26 and 24 percent respectively, to a low of 4 percent for AREA . Inspection of the unique values in the row labeled U(Xi), shows that the set called PRCS has the largest independent "contribution" with a value of 8 percent. In descending order these unique values for the other sets are 6 percent for SO, 2 percent for HB, 1 percent for RETH and zero for AREA. Hence, for each set of variables most of its variance associated with ACHV is confounded with the other sets of variables. This is completely so for AREA and almost completely so for RETH and HB.

It may be extremely instructive then to look at how these different sets of variables are intertwined or confounded with one another in their relationship with ACHV. Let us first look at the column that contains RETH since its explanatory power has been of major interest to us throughout this paper. RETH can be potentially involved in any of the coefficients (i.e., C( )'s) that have the number 5 as a subscript. Of the four second

order coefficients involving RETH, only one has a non-zero value (C(X4X5)) and that is the six percent in the overlap of RETH with SO. Aside from this six percent most of the confounding for RETH occurs either in its combination with two other sets of variables or in its combination with three other sets. For example, four percent of RETH is confounded with HB and SO while another seven percent is confounded with HB, PRCS and SO. Clearly then, we cannot make any generalizations about the "independent effect" of membership in a particular racial-ethnic group on ACHV, for this membership is almost completely confounded with a number of social conditions*.

We noted earlier that of these five sets of variables, RETH was the fourth lowest in its explanatory power. We may ask then of the role played in ACHV by these other sets of variables after considerations of RETH have been set aside. Of the total variation in ACHV associated with these sets of variables about 27 percent (obtained by subtracting 24 from 51) is unrelated to RETH. The variables that play the greatest role in this remaining variation can be ascertained by examining coefficients that do not have a 5 as one of their subscripts (i.e. C(X1X2X3X4)). Most of this variation (i.e., 21 percent) can be explained by the PRCS and HB sets taken together (i.e., the sum of their unique and common portions)**. The remaining six percent is accounted for by the set of school variables (SO). Consequently, some of the most salient variables in explaining differences among students in their ACHV, both before and

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* The nature of this confounding at the school level has been studied extensively in Mayeske, et.al., 1969.

**Elsewhere we regarded these sets taken together, as representing the student's family background (Mayeske, et.al., 1971).

Table 2 - Commonality Analyses of Family Background, Area of Residence, Student Body Achievement and Motivational Levels and, Racial-Ethnic Group Membership with Achievement

	1 HB	2 PRCS	3 AREA	4 SO	5 RETH
U(Xi)	2	8	0	6	1
C(X1X2)	5	5			
C(X1X3)	0		0		
C(X1X4)	2			2	
C(X1X5)	0				0
C(X2X3)		0	0		
C(X2X4)		0		0	
C(X2X5)		0			0
C(X3X4)			1	1	
C(X3X5)			0		0
C(X4X5)				6	6
C(X1X2X3)	0	0	0		
C(X1X2X4)	2	2		2	
C(X1X2X5)	1	1			1
C(X1X3X4)	0		0	0	
C(X1X3X5)	0		0		0
C(X1X4X5)	4			4	4
C(X2X3X4)		0	0	0	
C(X2X3X5)		0	0		0
C(X2X4X5)		0		0	0
C(X3X4X5)			1	1	1
C(X1X2X3X4)	1	1	1	1	
C(X1X2X3X5)	0	0	0		0
C(X1X2X4X5)	7	7		7	7
C(X1X3X4X5)	1		1	1	1
C(X2X3X4X5)		0	0	0	0
C(X1X2X3X4X5)	1	1	1	1	1
R SQ (Xi)*	27	26	4	32	24
R SQ (TOTAL)			51		

*Figures do not sum exactly due to rounding.

and after considerations as to their racial-ethnic group membership (RETH) have been set aside, relate to the motivational (i.e., PRCS) and social structural (i.e., HB) aspects of the family and to the achievement and motivational levels of the students one goes to school with (SO).

At the higher grade levels similar results were obtained, however, the role* played by RETH was somewhat smaller as noted earlier, while the unique "contribution" of PRCS was about twice as large and that of HB and SO about one-half and two-thirds as large respectively as they were at the sixth grade. These results reinforce a point made by Brookover (1963) that we should ask questions not only about class membership but also about attitudes concerned with the value of education and the ways in which these values are operationalized in the parent-child relationship for as we have seen they have a substantial role in ACHV that is independent of social class and racial-ethnic group membership. We should also be humbled by our ability to explain individual academic achievement for almost half of it remains unexplained even though we have experimented with a very wide range of variables (Mayeske, et.al., 1971).

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* By role we mean the variance in ACHV associated with RETH before and after adjustments had been made for FB, A, SO.

Summary

This paper has shown that for sixth grade students, 24 percent of the total differences among students in their academic achievement is the maximum national value that can be associated with their membership in one of six racial-ethnic groups (Indian, Mexican, Puerto-Rican, Negro, Oriental or white). This relationship prevails before the allocation of these groups to different social conditions has been taken into account. After a variety of social condition variables have been accounted for such as the social and economic well being of the family, the presence or absence of key family members, the students and parents aspirations for his schooling, their beliefs about how he might benefit from an education, the activities that they engaged in to support these aspirations,one's region of residence and the achievement and motivational levels of the students one goes to school with, this percentage dropped to 1.2. Similar results were obtained for other grade levels and for each region of the country. Hence, no inferences can be made about the "independent effect" of membership in a particular racial-ethnic group on academic achievement,for that membership, as it relates to academic achievement, is almost completely confounded with a variety of social conditions.

Other analyses showed that variables pertaining to the motivational and attitudinal aspects of family life (what one might term "educationally related child rearing activities")played a greater independent role in academic achievement than did either racial-ethnic group membership, social class membership or the type of school one attended. Of these latter two, however, the type of school one attended had a somewhat greater independent role than did one's social class membership.

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APPENDIX

Individual Student Indices and Variables

Socio-Economic Status (SES): a student with a high score on this index has parents who come from the higher educational strata, his father is engaged in a professional, managerial, sales or technical job, there are two to three children in the family, about six to ten rooms in their home, they are more likely to reside in the residential area of the city or the suburbs rather than in the inner city and there are intellectually stimulating materials accessible in the home such as books, magazines, newspapers, television and radio.

Family Structure and Stability (FSS): a student with a high score on this index has both parents in the home, his father's earnings are the major source of income, his mother works part-time or not at all and his family has not moved around much.

Racial-Ethnic Group Membership (RETH): a student with a high score on this variable is white, a student with an intermediate score is Oriental-American and a student with a low score is Puerto-Rican, Mexican-American, Indian-American or Negro-American.

Expectations for Excellence (EXPTN): a student with a high score on this index says that his mother, father and teachers want him to be one of the best students in his class and that he also desires to be one of the best in his class.

Attitude Towards Life (ATTUD): a student with a high score on this index feels that: people who accept their condition in life are not necessarily happier; hard work is more important than good luck for success; when he tries to get ahead he doesn't encounter many obstacles; with a good education he won't have difficulty getting a job; he would not sacrifice anything to get ahead nor does he want to change himself; he does not have difficulty learning nor does he feel that he would do better if his teachers went slower; and, people like him have a chance to be successful.

Educational Plans and Desires (EDPLN): a student with a high score on this index says that his parents want him to go to college, he both desires and plans to go to college, aspires to one of the higher occupational levels and feels that he is one of the brighter students in his class.

Study Habits (HBTS): a student with a high score on this index has frequent (weekly or more) discussions with his parents about his school work, was read to regularly as a child, spends one to three hours a day studying and one to three hours a day watching TV, would make most any sacrifice to stay in school and has seldom stayed away from school just because he wanted to.

Achievement (ACHV): a student with a high score on this index or composite tended to score high on all of the tests that entered into that composite. For all grade levels the tests of Verbal and Non-Verbal Ability were used as part of the composite. In addition, at grades six, nine and twelve, tests of Reading Comprehension and Mathematics Achievement were used and at grade nine and twelve a test of General Information was included in the composite. In one sense, this inclusion of more tests at the higher

grade levels represents the nature of the educational process, where basic skills are acquired in the early years and then other skills and knowledge are acquired through the use of these basic skills.

The standard deviations of this composite for each group at the different grade levels are:

	Grade Level				
Group	1	3	6	9	12
Indian	1.70	2.23	2.84	3.20	3.65
Mexican	2.03	2.14	2.76	3.45	3.42
Puerto-Rican	2.26	2.33	2.58	3.34	3.72
Negro	2.04	2.11	2.38	3.09	3.30
Oriental	1.38	2.69	3.35	3.61	3.84
White	1.56	2.15	2.65	3.27	3.22
Total	1.87	2.37	3.01	3.67	3.63

Student Body Variables

When the values of a variable are averaged for each of the students in a particular grade level of a school, this results in what is called a Student Body variable. Schools with a high mean or average on a Student Body variable tend to have a larger proportion of students with a high score on that attribute, while schools with a low mean or average tend to have a larger proportion of students with a low score on the attribute. The meaning of these variables at the individual student level were indicated earlier. The Student Body variables used in this paper are:

Student Body Expectations for Excellence
Student Body Attitude Towards Life
Student Body Educational Plans and Desires
Student Body Study Habits
Student Body Achievement

School Variables

In these studies, to represent attributes of the schools other than Student Body variables, the following comprehensive set of thirty-one indices and variables was used. A description of the meaning of each index and the variables that comprise it is given in Mayeske, et.al., 1971. A detailed description of the development of these indices and variables is given in Mayeske, et.al., 1969. The indices and variables are categorized into three subsets of Facilities, Pupil Programs and Policies, and School Personnel Expenditures. All but seven of the thirty-one are indices.

FACILITIES

(1) Plant and Physical Facilities

(2) Instructional Facilities

(3) Pupils Per Room

(4) Age of Buildings

PUPIL PROGRAMS AND POLICIES

(1) Tracking

(2) Testing

(3) Transfers

(4) Remedial Programs

(5) Free Milk and Lunch Programs

(6) Accreditation

(7) Age of Texts

(8) Availability of Texts

(9) Pupil Teacher Ratio

(10) Enrollment

SCHOOL PERSONNEL AND PERSONNEL EXPENDITURES

(1) Principal's Experience

(2) Principal's Training

(3) Principal's College Attended

(4) Principal's Sex

(5) Principal's Estimate of the School's Reputation

(6) Specialized Staff and Services

(7) Teacher's Experience

(8) Teacher's Training

(9) Teacher's Socio-Economic Background

(10) Teacher's Localism

(11) Teacher's College Attended

(12) Teaching Conditions

(13) Teaching Related Activities

(14) Preference for Student Ability Level

(15) Teacher's Sex

(16) Teacher's Racial-Ethnic Group Membership

(17) Teacher's Vocabulary Score

In the accompanying paper the above set of variables is referred to as the comprehensive set of 31 SCHOOL variables.

At the sixth grade the squared multiple correlations of the comprehensive set of 31 School variables (SCH) and the set of 3 Student Body Social Background (SBSB)* variables with each of the five School Outcome (SO) variables are:

	Expectations for Excellence	Attitude To. Life	Ed. Plans & Desires	Study Habits	Achievement
SCH	23	30	33	28	73
SBSB	46	57	50	57	79

* The SBSB set is comprised of the three student body variables of: Socio-Economic Composition; Family Structure and; Racial-Ethnic Composition.

Definition of Geographic Groupings

For the quantitative variables called "Area of Residence" the following scales were used:

Rural-Suburban-Urban - a seven point scale with a low value for rural through intermediate values for small towns and cities to large values for suburbs, residential and inner parts of large cities.

Region - a three point scale, scored: low for South (Alabama, Arkansas, Arizona, Florida, Georgia, Kentucky, Louisiana, Missippi, New Mexico, North Carolina, Oklahoma, South Carolina, Texas, Tennessee, Virginia and West Virginia); intermediate for the Far West and Rocky Mountain states of Alaska, California, Colorado, Hawaii, Idaho, Montana, Nevada, Oregon, Utah, Washington and Wyoming; high, for the 23 Northern states.

When regional stratifications were used, included as South were the above 16 Southern states; all other states were included as North.